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Teaching and Learning Clinical Reasoning: Tutors' Perceptions of Change in Their Own Clinical Practice.

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How this fits in

Clinical reasoning is a consultation skill that historically was not formally taught. Most clinicians acquire it over years of practice.

A group of established general practitioners reported benefits to their own clinical practice as a result of teaching on an undergraduate clinical reasoning course.

It may be of benefit to others to include clinical reasoning in their continuing professional development plans.

Key words: general practice, decision making, continuing professional development

ABSTRACT (208 words)

Background: Clinical reasoning is an important skill for all clinicians and historically has rarely been formally taught either at undergraduate or postgraduate level. Clinical reasoning is taught as a formal course in the fourth year of the undergraduate programme at Keele Medical School by tutors who are all practicing general practitioners.

Aim: We aimed to explore the tutors' perceptions about how teaching on the course has impacted on their own consultation skills.

Design and setting: All eleven course tutors who had taught on the course for at least one full academic year were invited to take part in recorded individual semi-structured interviews with an experienced, non-clinical, qualitative researcher. The data were analysed using qualitative methods.

Results: Eleven tutors participated, with a range of 7-32 years of clinical experience. They reported better decision making, greater use of metacognition, more self-awareness, more reflective practice, more confidence and greater job satisfaction. They also reported positive impacts on their own knowledge and learning, and assumed concomitant benefits for their patients.

Conclusion: All clinicians in this group perceived benefits on their consultation skills as a result of teaching clinical reasoning. There is a need to provide education, training and continuing professional development in cognitive consultation skills to students, trainees and established practitioners.

ARTICLE (words)

INTRODUCTION

There is some evidence that doctors who teach in their clinical settings are aware of a positive impact on their own clinical skills [1]. Clinical reasoning is a consultation skill and, though there is growing interest in it as such [2], few doctors have been formally taught it. Indeed, there is an ongoing debate about whether or not clinical reasoning can be taught. Schuwirth suggests that it is an ability rather than a skill which is 'learnt or acquired … independently of teaching staff' [3]. There is an acceptance that development of expertise requires many thousands of hours of practice [4] which doctors gradually accrue throughout their undergraduate and postgraduate training and years of clinical

practice. Current medical students and graduates have less clinical exposure than their predecessors [5] and are therefore likely to accrue these skills more slowly.

At Keele, fourth year medical students have a course in clinical reasoning which, at the time of this work, involved five classroom days set into a five week placement in general practice [6] (see table 1). The aim of the course is to help students to become competent interpreters of the information that they gather in order to make good clinical decisions and to develop the communication skills which they will need to be able to reach a shared understanding with patients and to share decision making with them.

This course links key concepts of clinical reasoning to clinical cases which the students bring to the teaching sessions thus embedding the learning of clinical reasoning in the context in which it will be applied, that is in clinical care [7]. We hope that our course speeds up the process of acquiring skills by exposing students to the concepts and giving them deliberate, focused, repetitive practice in making decisions. The most important concept is metacognition, defined by Croskerry [8] as 'the process by which we reflect upon, and have the option of regulating, what we are thinking'; the focus of the course is promoting the use of metacognition actively and overtly in clinical practice.

METHOD

This retrospective, qualitative study made use of semi-structured interviews to explore the perceptions of the tutors who taught on the course in its first three years of the impact of teaching the course on them and their clinical practice.

Sample

All tutors (n=11) who had taught on the course for at least one complete academic year and had taught at least one full set of five days of the course were invited to participate.

Interviews

The interviewer (PL) is a behavioural scientist with no direct connection with the Higher Consultation Skills course.

The topic guide included:

- Demographics
- Perceptions of the impact teaching on the course has had on tutors
- Perceptions of the impact on tutors' learning

Ethical approval

The study received approval from the Keele University School of Medicine Ethics Committee on 30.08.2012.

Consent

Participants consented to their interviews being recorded and directly quoted in presentations and published material.

Data analysis

A thematic analysis using qualitative methods was undertaken independently by two members of the research team (MB and SG); the themes being identified from the data. Initially, the transcribed interviews were independently coded, then three iterations of categorising and re-categorising followed, when agreement was reached on the final themes and subthemes. This process is based on the principles of Grounded Theory [9], in which theories are generated from the analysis of data.

RESULTS

All eleven tutors agreed to take part in the study and were interviewed between September 2012 and October 2013. All comments quoted in the results from the three individuals who were involved with the leadership of the course are denoted with an asterisk (*).

Demographics

Participants had graduated a mean (range) of 22 (7-32) years previously and had been GPs for 18 (1–29) years at the time of interview (see table 2).

Themes

Five overarching themes were identified from the data.

Theme 1: previous learning about clinical reasoning

All tutors, even the most recently qualified, commented that clinical reasoning had never been formally taught during their undergraduate or postgraduate training.

> *M3 "…it is something that you just had to try and figure out yourself just by experience and learning from senior members of staff…"*

Theme 2: self as doctor

All tutors commented on benefits to themselves as doctors. These benefits were grouped into five broad categories:

1. Confidence

There were a variety of ways in which this was expressed and the strongest expressions of it were from the more experienced GPs.

F4 "…I feel much more comfortable at the end of a consultation that I have taken all the information into account, that I've thought of a differential diagnosis, that I've searched for other things to confirm or refute the diagnosis... but I haven't ignored things that patients have thrown in which don't fit my pattern."

2. Job satisfaction

There were positive expressions of job satisfaction from all tutors. For some it was about the enjoyment of an increased ability to analyse their practice and therefore feel that it was validated; for others it increased the sense of a job well done.

M7 "…I've been, as it were, a bit happier as a doctor…"

3. Metacognition

All of the tutors commented that teaching on the course had improved their clinical decision making as a result of improvements in their metacognitive skills.

M4 "…it's the metacognition, or intellectual self-audit. Its 'how do I know I'm right?' which involves a little more checking of the diagnosis than perhaps I would have otherwise."*

4. Self-awareness

The tutors commented on how the teaching had led to increased self-awareness. Their comments were related to several different aspects of this, and there was some overlap with the expression of an increased ability to use metacognition. However, an awareness of professional limitations and fallibility, especially when tired or under pressure, are distinct from the skill of metacognition.

M2 "…it makes you aware of many things, of your limitations, how easy it is to make mistakes, how easy it is to become over confident..."

Two tutors commented on changes in the way they monitor and act on their own psychological and physical needs in order to practice safely and effectively. F2 has used her reasoning skills for priorisation and become more confident that she can do this safely. F4 refers to the inclusion in the teaching material of an article about the negative impact on cognitive function as a result of having a full bladder and the wisdom of emptying it before seeing the next patient rather than waiting until afterwards [18].

F2 "If I'm running late I feel more comfortable de-prioritising certain things, because I'm aware that if I run too much more late I'll become too panicked and just won't be able to do anything. I'll have a more doctor-centred approach when I need to, because I'm aware that if I let things become too difficult, then I'm just not going to be able to function."

F4 "…it's made me more confident in what I do… like when I stopped to go to the loo made me much more focused when I got to the clinical room."

Tutors reported increasing reflection about many aspects of practice, including their communication skills, their clinical knowledge, and their involvement of patients in making decisions.

M3 "…it makes me reflect a lot on my own clinical practice... I think that in itself has just sharpened up my own history taking skills…it's actually made me a better clinician I think."

Theme 3: knowledge and skills

All tutors commented on the benefits to their clinical knowledge, either in terms of gaining new knowledge, or refreshing their knowledge. For one, the main benefit was in the area of developing a *'broader repertoire of readily accessible information sources' (M4*)*. A very experienced GP (F4) talked about the way in which she had changed her management of some very straightforward conditions such as urinary tract infections and osteoarthritis as a result of the knowledge she had gained.

All tutors commented on the effects the course had had on their clinical skills; for some, these changes were profound. F4 describes a '*total transformation'* in the way that she practices and tells a story about being in a clinical situation without any of her usual support and resources, on a train journey in Siberia where she was responsible for the medical care of 166 passengers. There were many people with symptoms of gastro-enteritis and one man who had also drunk a significant quantity of vodka. Acute pancreatitis was amongst F4's differential diagnoses. She describes consciously working through a hypothetico-deductive process in order to make the diagnosis, feeling confident, as a result, that she made a good decision.

> *F4 "It's totally transformed my medicine… having been a GP for 20 years… I would say I've practiced very, very differently. I mean, really differently. Obviously, I'm seeing the same patients and things, but my approach to each problem, my approach to each patient is recognisably very altered..."*

One tutor commented that *"it doesn't stop you making mistakes,"* however, he goes on to talk about the ways in which the course has helped him to analyse mistakes and

therefore he has become less likely to make them again, and to predict the conditions in which he is more likely to make a mistake which he can then actively prevent.

Theme 4: outcomes for patients

This is an area where there were many comments from all tutors. They all talked about how difficult it is to measure such outcomes but they felt that, from many perspectives, things were better for patients. There were two broad aspects to how things had improved; firstly, improvements in patients' safety as a result of better clinical decision making and secondly, improvements in communication with patients; checking their understanding and involving them in decision making.

> *M1 "…more individualising treatment... finding out more about the patient's circumstances and tailoring it to that. At the end of the day they've got to go away and change something so you have to have their agreement, you have to empower them. I think more thinking like that and I perhaps more checking with the patient to check they've understood."*
>
> *F2 "It's given me permission to manage those more serious things [like angina] in a safeguarding way, no, in a way that rules out risk to a reasonable level…"*
>
> *F4 "…there is much more of a plan in the notes so if I'm not going to be there with the patient the next time, it's quite easy for someone else to pick it up."*

Two tutors commented on their consultations taking longer as a result of the course. They can see the benefits to patients and do not imply that it is a negative outcome for themselves.

> *M2 "…my consultations now, they are taking a bit longer… I am more aware of many things that I wasn't before… involve the patient more in the consultation, in the decision making and everything. All those things take time and then, because you have done a little bit more, you have to make an entry in the record and this is going to be inevitably more extensive so you do take a few minutes more… and end up running a little bit late.*

Theme 5: personal learning

In terms of personal learning, there were direct comments from four of the participants. For M4, the effects are particularly strong.

> *M4* "It's impressed upon me the futility… of even trying to… 'keep up to date'… The course material is out with my clinical comfort zones and that stimulates learning… A lot of my learning is 'just in time'–it's helped and improved my skills to find that which I need right now, right now."*

DISCUSSION

This study has demonstrated that a group of physicians, most with extensive clinical experience, perceive that their practice has benefited as a result of contributing to an undergraduate course on clinical reasoning in the consultation. They perceived benefits for themselves as physicians, through increasing skills and knowledge, and for their

patients in terms of improved outcomes through better decision making. They report benefits which reflect the aims of the course and importantly, while they had achieved some of the learning outcomes as a result of informal learning throughout their careers, this learning had not been part of their formal training or professional development since graduation. It may be that they had developed 'unconscious competence' without having gone through the conscious phases of incompetence and competence that precede this state [19]. This group includes nine who have been GPs for more than ten years, and five for more than 20 years. It might be assumed that they are 'expert' decision makers, and yet they report significant learning as a result of their teaching.

The findings have profound relevance to current health care and medical practice. Many comments touch on the issue of patient safety, and these comments are from a group which includes a majority of experienced clinicians. They describe more checking of the correctness of decisions and more effective communication with patients. We suspect that less experienced clinicians, if they could be engaged in similar learning, would make similar gains. In addition, if doctors are physically and psychologically comfortable they are likely to be making better decisions [11, 21, 22]; learning which these clinicians seem to have absorbed. Associations between clinical reasoning teaching and patient safety have been described in the literature [23] and some of the comments we report focus on patient satisfaction, which has been also linked to better outcomes [24]. There is evidence that the tutors are being prompted to reflect deeply on their practice as a result of teaching the course material, and it is likely that such reflection will have a benefit for their clinical practice [11].

Although very little is written about what GPs choose to focus their own learning on, it is likely that few spend time developing their consultation skills [25] and while some aspire to do so, such development is difficult to access [26]. They are perhaps more likely to update knowledge, both clinical and operational, perceiving this to be more measurable and more directly related to the delivery of patient care; thus it is this knowledge that tends to be the focus of continuing medical education [27].

We consider that these are compelling reasons for including this kind of learning in undergraduate medical curricula and, we would argue, in postgraduate training and continuing professional development if only to provide language with which to discuss clinical reasoning. It is very difficult to have a meaningful conversation about concepts without a common terminology and this is important because much learning is as a result of verbal interaction and socialisation within communities of practice [20]. It is possible that it is this historical lack of a common vocabulary which has led to the absence of teaching in this field. We can say however that this group of GPs has clearly benefitted from their learning, in terms of their job satisfaction, confidence, self- awareness and clinical knowledge and skills. As one tutor put it:

> M1 *"I'm getting a lot of benefits on a plate… I'm sort of blessed to have that opportunity to use that information. I consider myself fortunate... it's been*

good educationally and not a lot of GPs at my stage in their career have that kind of input."

Another commented on how 'being out with his comfort zone' has stimulated learning, which raises an interesting point. It is likely that doctors spend more time updating in areas that they enjoy and are probably already well informed in, when in terms of real development and patient safety, they should perhaps be encouraged to address areas where they are weaker. The same could be true for clinical teachers; encouraging them to teach material which is less familiar to them, and which takes them into their zone of proximal development [29] may be likely to have a more profound effect on their own learning and on their own confidence, both as doctors and as teachers

The study has a number of strengths. To avoid bias, the interviews were conducted by a non-clinician, who also had input into the topic guide. The interviews were transcribed by someone independent of the medical school and university. The data were analysed by two people (MB and SG) independently and the themes refined in discussion. All eleven tutors with at least one full year's experience of teaching the course were interviewed. This includes those who led and designed the course as well as taught on it (MB, SG and RM), as their perceptions about the effects on their own clinical practice are relevant and add to the richness of the data. However, this could have led to an unbalanced outcome, as they might have had a vested interest in positive perceptions. For this reason, their comments have been clearly identified in the text. During the analysis, we took care to

reflect on our own beliefs, opinions and experiences and how they might be influencing our interpretation of the data.

A limitation is that numbers are small, however, all tutors who met the inclusion criteria were interviewed. All of the tutors are GPs, so the results may not be generalisable to clinicians from other specialties. It is an academically inclined group and the majority are very experienced GPs, meaning that their perceptions might not be typical of all GPs [28]. Nevertheless, these data indicate that a group of GPs who were sufficiently interested in a course on clinical reasoning in the consultation to teach it learnt from their engagement. We believe that benefits of similar magnitude could be accrued by many clinicians.

CONCLUSION

This group of eleven GPs who, as a result of their clinical teaching have had a significant exposure to the concepts and theories of clinical reasoning and decision making describe significant positive impacts on their own clinical practice, both in terms of their comfort with and confidence in their work, and the assumed improvement in outcomes for their patients. This work adds to the evidence that clinical reasoning skills can be learnt as a result of a focused and guided consideration of theories about cognition and metacognition.This study demonstrates that there is a need to provide education,

training and continuing professional development to students, trainees and established practitioners in cognitive consultation skills.

Declarations of Interest: the authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Contributors: This study was conceived by MB and SG and all authors were involved in its design. Interviews were conducted by PL. Data analysis was undertaken by MB and SG. The first draft of the paper was written by MB. All authors contributed to subsequent drafts and approved the final version.

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Table 1: the contents of the clinical reasoning course

Week 1	Clinical Reasoning	• The theory of clinical decision making especially making diagnoses • Inductive and hypothetico-deductive decision making • Dual process model [10]
Week 2	Error and Bias	• Cognitive error and bias • Metacognition [11] • Strategies to reduce and mitigate error [12,13]
Week 3	Information Management	Reasoning skills to identify the information needs within the consultation: • For and about the patient • For the doctor • Searching for information and the critical appraisal of it • Application of the information in real time[14,15]
Week 4	Effective Management	Application of previous learning to: • Reaching shared understanding with patients about disease and illness • Identifying and implementing appropriate and acceptable management plans for individual patients • Simulated patient practice with immediate feedback from simulated patients, tutors and peers
Week 5	Maximising Adherence	Application of previous learning to: • Shared decision making • Motivational interviewing [16,17] • Simulated patient practice with immediate feedback from simulated patients, tutors and peers.

Table 2: the demographics of the course tutors (*denotes those with a course leadership role)

Tutor ID	Gender	Age	Years since qualification		Academic Grade	Clinical role	Years Teaching HCS
			Dr	GP			
M1	Male	56	25	18	Sessional tutor	GP principal[a]	2
M2	Male	49	20	10	Sessional tutor	GP principal	2
M3	Male	31	8	3	Clinical teaching fellow	GP freelance[b]	2
M4	Male	55	30	24	Professor*	Salaried GP[c]	3
M5	Male	47	24	20	Clinical lecturer*	GP freelance	3
M6	Male	55	32	27	Clinical lecturer	GP principal	2
M7	Male	65	30	29	Sessional tutor	GP freelance	2
F1	Female	50	27	23	Clinical lecturer*	GP freelance	3
F2	Female	31	7	1	Clinical teaching fellow	Salaried GP	1
F3	Female	43	19	13	Senior lecturer	Salaried GP	3
F4	Female	55	24	19	Sessional tutor	GP principal	3

[a] A general practitioner (family physician) who is a partner in a medical practice.

[b] A general practitioner who works on an un-contracted sessional basis (a locum) in one or more practices.

[c] A general practitioner who is employed on a regular contractual basis , usually in one practice